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TITLE: A Description of the Impact of Multimedia Anchored Instruction on Classroom Interactions

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ABSTRACT

This preliminary study explores and describes the effects of a multimedia based anchored instruction intervention on student/teacher interactions in an eighth grade social studies classroom. Nineteen students enrolled in a general education 8th grade social studies class participated in the year long study, including ten general education students and nine students with mild disabilities. Overall, instruction became more interactive as observational and interview data indicated a twofold increase in the number of daily student/teacher interactions after the intervention was implemented. Concurrently, the quality of the interactions, as indicated by the number of interpretive questions asked by teachers, was found to be substantially higher than those occurring during the baseline phase of this study. Results show that, during the intervention period, less class time was spent in addressing management problems and task/direction issues.

INTRODUCTION

Cognitive science research is providing a wealth of knowledge about the ways individuals think and learn (Walberg, 1991; Wang & Walberg, 1991). This research indicates that many students learn best in environments that teach them to apply knowledge rather than viewing knowledge as an entity, attribute, or relationship that must be memorized. This is in direct contrast to traditional didactic teaching models, where teachers do much of the thinking for their students and tend to provide students with “rules” and “facts” that must be memorized and recorded on paper as evidence of subject mastery (Willoughby, 1990). As a result of this instruction students frequently find it difficult to: recall the information; apply the facts outside of the learned context, and use the information to solve daily life problems (Bransford, Sherwood, Hasselbring, Kinzer & Williams, 1990; Cognition and Technology Group at Vanderbilt [CTGV], 1991a; 1992a; 1993a; Whitehead, 1929).

The traditional didactic view of education is being challenged by literature arguing that students should be recognized as the most important element in the teaching and learning process (Barnes, 1989; Campione & Brown, 1990; Wang & Palinscar, 1989). This literature reports that academic outcomes improve when students are provided with opportunities to interact during explorations of real life problem situations. A central tenet is the belief that knowledge cannot be transmitted from one individual to another but rather that knowledge is constructed by learners as they engage in activities they believe are meaningful to their everyday lives (Driver, Asoko, Leach, Moretimer, & Scott, 1994). Advocates of this constructivistic approach to learning encourage students to form a community of learners in which students are actively involved in learning, take responsibility for managing their instruction, and interact with their peers as they help other members of their class learn. In these new learning communities, students are no longer passive observers, but are active participants in the teaching and learning process. Within these classroom environments, students are encouraged to offer ideas and raise questions about the content they are studying. As students begin to critically examine and discuss new information, research suggests

that students are better able to generate links between new information and their existing knowledge base (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990). Similarly, the learning community offers opportunities for students to interact and analyze divergent views and alternative approaches to solving problems that are discovered during the learning process. As students begin to evaluate ways to approach problem situations or to discuss issues that have been raised in the classroom, they are forced to ask hard questions, evaluate data, analyze information, articulate issues, challenge assumptions, reflect on their background knowledge, and draw conclusions that can transfer to new problem situations (King, 1994; O'Keefe, 1995).

The view that learning is social and occurs in a community is consistent with Vygotsky's theory that social interactions among diverse individuals under adult guidance, or with more capable peers, helps a student develop academically (Vygotsky, 1962, 1978; Wertsch, 1985). As they work cooperatively with other members of the classroom learning community, students begin to construct a collective analysis of information. The resulting synergistic outcome exceeds the individual contributions of each member of the group. Evidence indicates that sharing information, processing knowledge, and expressing thoughts verbally increases academic outcomes for all learners (Barnes, Britton, & Torbe, 1990; O'Keefe, 1995).

To establish classrooms in which interactions and inquiry is prized, teachers must change their role and learn to be a coach, questioner, organizer, observer and consultant rather than a lecturer. In short, the teacher must place a substantial responsibility for learning on her/his students and must create an atmosphere in which students are highly engaged in discussions that promote in-depth analysis and synthesis of information (Nystrand & Gamoran, 1991). Current research suggests that this type of instructional environment will enable the learner to experience first hand the usefulness of information for solving problems (Bransford, Vye, Kinzer, & Risko, 1990; Duffy & Jonassen, 1992).

Student-teacher and student-student interactions are critical to this approach. While a positive relationship between the level of interactions, questioning, and thinking has been reported in general education classrooms where constructivist instructional principles were employed (O'Keefe, 1995), to date, there is little information describing the impact of constructivistic learning procedures and environments on the interactions, questioning, and outcomes attained by students with disabilities. Given the continuing importance of identifying effective interventions for students with disabilities and the key role of questioning and interactions to the social construction of knowledge, a preliminary study was designed to explore and describe the effects of a constructivistic instructional program on the number and type of student/teacher interactions and the questioning that occurred in an eighth grade social studies classroom where nearly equivalent numbers of disabled (9) and nondisabled (10) students were enrolled.

The constructivistic instructional approach used was multimedia anchored instruction, an approach that has been described in detail elsewhere (McLarty et al, 1986; Kinzer, Gabella & Rieth, 1994). Below, we provide a description of the instructional method, the participants and the materials used to create changes in the classroom environment, and then provide data on interactions that occurred in conjunction with the implementation of the intervention.

METHOD AND PROCEDURES

PARTICIPANTS

Students. Nineteen eighth grade students participated in the year-long study. They ranged in age from 13 to 15 years of age. Ten students were general education

students while the other nine were identified as learning disabled or mildly mentally retarded by a licensed school psychologist, and were receiving special education services in the inclusive general education classroom setting. The students with disabilities had long histories of academic difficulties and reading achievement levels that were at least three years below grade level. In this classroom all students received instruction from the general education teacher, however, a special education teacher who was assigned full-time to this classroom provided additional individualized instruction as needed by students with disabilities. This teaching configuration prompted the school system to categorize the classroom as "inclusive" for students with special needs.

Teachers. Over the course of the study, instruction was provided by varying combinations of two classroom teachers and two graduate research assistants (RAs). Specifically, the RAs provided instruction during baseline and the entire first semester. During the second semester instruction was provided by one RA and the general education teacher. Both classroom teachers had masters degrees, more than five years teaching experience, and each held teaching certificates; one in elementary education and one in special education. Similarly, both RAs had masters degrees, at least three years of teaching experience, and both held teaching certificates; one in elementary education and one in special education.

INSTRUCTION

Project related instruction took place for 10 weeks each semester. It commenced a month after the start of the semester and concluded about two weeks prior to the end of the semester. The timing allowed for pre and post testing, interviewing teachers and students, and trial classroom observations. During the first semester students participated in a total of 28 instructional sessions with each session lasting approximately 75 minutes. During the entire first (Fall) semester, the classroom instruction was provided by the two RAs. During the first week of the semester, before the intervention was implemented, baseline observational data were collected. During this period the RAs implemented lessons prepared cooperatively with the classroom teachers in order to establish baseline rates of interactions and teaching behaviors. The regular classroom teachers were present for all instruction and were invited to participate in on going discussions about events that occurred in the classroom.

During the second (Spring) semester instruction was provided by the classroom teacher certified in general education and the RA who was certified in general education. The special education teacher and the second RA observed and participated in ongoing discussions about events that occurred in the classroom. During the second semester, students participated in 36 instructional sessions. However, instructional sessions during the second semester lasted approximately 55 minutes to accommodate mandated changes in the grade level schedule requested by the principal.

CONDITIONS

The study consisted of two conditions including a baseline and one intervention condition that was divided into four phases. The baseline condition occurred prior to the implementation of the anchored instruction intervention. The anchored instruction intervention implementation condition consisted of four phases: watching the anchor, retelling and segmenting, characterization, and student research. All conditions are described, in detail, below.

Baseline. During the first week of the study, prior to implementing the intervention, multiple observations of the target classroom setting were conducted. Two video cameras were set up at opposite ends of the classroom. Each class was videotaped and audiotaped. The videotape was then analyzed using the observation system (see

measurement section) developed to identify the number and type of student/teacher interactions that were occurring. These baseline observations were later compared to those recorded during the implementation of the instructional intervention to determine if a change in the number and types of interactions had occurred.

Instructional Intervention. Anchored Instruction an instructional technique that begins with a focal event or problem situation presented via a video segment or movie, provides students with a mental model or an "anchor" to facilitate learning was employed as the intervention (Bransford, Kinzer, Risko, Rowe & Vye, 1989; Bransford, Sherwood, Hasselbring, Kinzer & Williams, 1990). Generally, students enter a classroom with a variety of different experiences and knowledge, and with different beliefs and ideas, yet they are expected to attain similar understandings of new concepts and ideas. Historically, if students are to be successful in school, they are expected to interpret these ideas in the same manner as the teacher. Alternatively, anchored instruction provides a semantically rich, contextualized, shared environment that generates interest in curriculum while enabling students to identify and define problems as they explore content areas from different perspectives.

A preferred method of delivering anchored instruction is through the use of contextualized video instruction via videodisc or compact disc. Human beings have vast capabilities for recognizing and remembering visual details. Studies indicate that children and adults are able to recognize details from images with an accuracy that often exceeds 90 percent, weeks or months following their initial encounter (Hutton & Lescohier, 1983). Thus, multimedia anchors are useful tools as teachers attempt to provide students with a common background on which to base classroom discussions and instruction. The visual format provides students with cues to aid them as they attempt to perceive concepts that are difficult to interpret in written form. Related research on anchored instruction indicates that the ability to perceive dynamic, moving events, often facilitates comprehension which, in turn, enables students to form mental models of a given problem situation (Bransford, Sherwood, Hasselbring, Kinzer & Williams, 1990, CTGV, 1992a). The ability to form mental models with apparent ease is especially important for lower-achieving students and students with little knowledge in the area being explored (CTGV, 1989).

Additionally, as students explore the anchor from their perspective, they experience changes in being able to recognize and understand relevant information and the ways it can be used to solve problems (Bransford, Sherwood & Hasselbring, 1988; CTGV, 1990; 1991b; 1992b; 1993b; McLarty, Goodman, Risko, Kinzer, Vye, Rowe & Carson, 1989; Sherwood, 1991). Research indicates that as students learn to use their existing knowledge as a tool to solve problems, they begin to gain confidence in their implicit knowledge and recognize its availability for unfamiliar tasks (Bransford, Goin, Hasselbring, Kinzer, Sherwood & Williams, 1988; CTGV, 1992b; Lampert, 1986). As a result, students learn to generate their own paths to solutions and begin to understand alternative solutions and approaches, thereby becoming conscious, creative problem solvers.

Selection of Curricular Content and Materials. The curricular content for both semesters consisted of integrated language arts and social studies content mandated by the state educational goals. State goals for eighth grade included the study of the Post World War I and World War II periods of history. During the first semester, the research team identified the content, created the lesson and collected supplementary resources. The research team designed lesson plans to provide opportunities for high levels of student involvement in which both the teachers and students built upon students' responses to teacher initiated questions based on the anchor. During the second semester, the classroom teachers were included in the planning and decision

making process, after having spent a semester observing the research assistants model the intervention.

MATERIALS

Fall Semester. During the fall semester a commercial videodisc, To Kill a Mockingbird, was used as the multimedia anchor to address issues related to the post World War I time framework required by state curriculum guides. This anchor was selected to teach the curricular content focused on issues of money, power and human relationships during the 1930s. These issues were examined as students explored information contained within the anchor. Additionally, newspaper clippings, Groliers Electronic Encyclopedia, supplementary video clips, pictorial accounts of the time period, music and literature of the era, the internet, and interviews with individuals associated with the events under investigation were used as supplementary resources for students as they conducted research on topics related to the curriculum. The supplementary resources were collected prior to the beginning of the intervention and were housed within the classroom so students could access them as needed. Students also used the school library resources, though these resources were limited.

Spring Semester. During the spring semester, the timeframe focus shifted to World War II. The curricular content continued to focus on the issues of money, power, and human relationships while using the made for television movie Playing for Time as the video anchor. This video depicts the lives of female Jewish musicians as they struggled to survive in a concentration camp in Nazi Germany. Students were provided with newspaper clippings, other sources including Groliers Electronic Encyclopedia, supplementary video clips, pictorial accounts of the time period, music and literature of the era, the internet, and an interview with a holocaust survivor to complement the curricular content. The curriculum for the spring semester paralleled the curriculum that was implemented during the fall semester. Additionally, students built on their knowledge about the concepts and about the themes of money, power, and human relationships as well as knowledge of questioning techniques and research skills needed to successfully interact in the classroom environment.

During both the first and the second semester, the classroom teachers directed the flow of instruction by asking and promoting questions that required the students to think broadly and deeply about ideas presented within the anchor. Students were encouraged to build on responses articulated during group discussions and their peers' previous questions. Teachers asked questions as needed for clarification and to enhance shared understandings. Although the teachers often facilitated classroom conversations, they did not dominate them.

INTERVENTION IMPLEMENTATION

PROCEDURES

Phase 1—Watching the Anchor. Each semester, all students watched the respective video anchors as a large group. This activity provided the class with a shared context for future exploration and discussions of the concepts and ideas presented in the anchor. The shared context enabled students to: a) identify and define problems or issues in the real world setting as seen in the video, b) explore reasons for problem solutions, and c) generate strategies for solving problems or addressing issues within a realistic context presented in the video. These activities were consistent with previous research on anchored instruction curriculum development (McLarty, et al., 1989).

Students were given an opportunity to view the anchor in its entirety without any teacher intervention or prior classroom discussion. Their reactions and verbal comments in response to the video were recorded on videotape. These responses were used by the classroom teachers to promote discussions during the retelling phase of the intervention.

Phase 2—Retelling and Segmenting. As advocated by McLarty et al., (1989) students participated in a segmenting activity designed to develop a shared expertise in the anchor. By breaking the video anchor into meaningful units or segments, students were able to record the frame numbers of specific scenes to use as references to support arguments in classroom discussions. As a class, the students constructed several strategies for breaking the video into segments. They discussed breaking the video into segments based on scene changes as they had seen done on television for commercial breaks. They also discussed the prospect of segmenting the anchor based on a characters appearance within a scene. Eventually, the students decided that they should focus on the content of the discussions between characters and the changes in topics that occurred as the movie progressed. The video was then broken into meaningful segments using this strategy.

During the fall semester the retelling activity took place as part of a large group discussion. However, during the spring semester, in an effort to reduce the amount of time spent on the segmenting activity, the retelling activity took place in three smaller groups whose members were selected cooperatively by the teacher and students. The video was divided into thirds and each small group was assigned one third to segment. Each group recorded their retelling of the assigned video selections on sentence strips and displayed them for all the groups to preview and discuss.

In many instances these retelling activities resulted in discussions where students uncovered contradictions, made assumptions and corrected previously held misconceptions about the content. Then students reviewed the video segment under discussion to resolve conflicts or to clarify the events portrayed in the anchor. All large group discussions were captured on video and audio tape and then coded for subsequent data analysis.

Phase 3—Characterization. Students conducted an analysis of each of the main characters presented within the anchor story line. As students began this character analysis, the class was broken into small groups of approximately 5 students. The membership of each group was determined cooperatively by the teacher and students. Each group examined one character from the story to study in detail. They identified their characters' basic personality traits, and the societal influences that shaped the characters' personality and reactions. Subsequently they selected a single vignette from the anchor to substantiate their analysis of the individual's character traits. Each group's information was synthesized and presented to the class along with the supporting vignette in the form of a small group presentation. As this activity took place, students were provided with an indepth look at the individual traits of each character presented in the anchor. Additionally each group had opportunities to ask questions and critically reflect on their classmate's analysis.

Classroom Discussions. As students became experts in the content of the anchor, classroom discussions focusing on the themes of money, power and human relationships were conducted in response to student generated questions. For example, during a discussion of To Kill a Mockingbird a group of girls discussed the lack of power Mae Ella had as a poor girl growing up during the depression. They were deeply troubled that she had no way to escape from an abusive father and yet others in society refused to see her plight. They reacted very strongly to the idea that Mae Ella had power over Tom Robinson's life, and consequently his family, simply because she was European American and he was African American. They began to question the role women played in society in the 1930s to determine if the events portrayed in the video were historically accurate. This led to additional questions about the changes that had taken place between the 1930s and the present. Subsequently, their questions began to focus on the Women's Suffrage Movement. The teachers encouraged and

facilitated these discussions as they asked questions to generate additional ideas on the topics presented in the class. In this manner the teachers modeled an investigative approach to learning.

Students argued multiple points of view as they discussed the events, actions, and individuals represented within the video. Students used these different perspectives as they examined the anchor to look for clues to determine the historical and geographical accuracy of information contained on the videodisc. For example, one very animated classroom discussion focused on the character of the female Nazi commander in Playing for Time. Students examined this character from multiple points of view as they tried to determine her values. On one hand, this character gently placed shoes on Fania's feet to protect her from the elements while, on the other hand, this same woman pulled a child from its mother's arms and, disregarding the mother's screams for her child, shoved the woman onto a truck to be sent to her death. The commander raised the child as her own, only to relinquish him to the gas chamber for the good of her country. Did this female commander rescue the child as an act of compassion? Did she value human life? As students examined this woman's motives and actions, they began to realize that these very complex inconsistencies existed within one individual. Depending on the point of view that they took, her actions were interpreted differently.

Phase 4—Student Research. Students were divided into small groups of 4 to 5 class members to research issues that they had identified as important to their understanding of the curricular content. Again group composition was determined cooperatively by the teacher and students. Students began to develop research questions around issues arising from small group discussions about the anchor.

During the first semester several students focused their research on the Great Depression. These students stated that they thought that the economic climate of the 1930s played an important role in the human relationships depicted in To Kill a Mockingbird. Other students focused their research on the 1960s where they explored the events and the people that created the political and social changes that are evident in today's society (e.g., Martin Luther King Jr., Malcolm X, Medgar Evers).

Similarly, during the second semester, students focused on several different research topics related to Playing for Time. One group was interested in Hitler, his background, and the formation of his ideology while other groups of students were interested in studying children of the Holocaust, conditions that lead to Hitler's rise to power, and Nazi concentration camps.

During both semesters, the anchors functioned as a focal point for the students' comprehension as they used text books, reference books, other literature, photographs, electronic encyclopedias and the internet to acquire the information needed to answer their particular research question. These resources were available within the classroom, however, the students were responsible for identifying the resource they needed to begin to answer their research question. Additionally, during the second semester, the students had an opportunity to participate in a question and answer session with a holocaust survivor.

Each member of the group was required to contribute to the research and to participate in the creation of a multimedia presentation to showcase their understandings. Individual group members had to work together to determine the role each member would take as they divided the work load to accomplish these goals. In some situations there were members of some small groups who were non-readers or who were poor readers functioning several grade levels below the norm. Due to the nature of the intervention, these class members were able to participate fully in the class discussions based around the video anchor. Their insights and reasoning abilities

had not been hampered by their lack of reading skills. However, as these students entered the research phase of the instruction, they began to revert to the role of a passive learner because of the literacy demands of the assignments.

To combat the students' increasing passivity the teachers worked individually with each group to help students identify roles and activities for each member of the small research group. For example, in one group a non-reader was given the responsibility of locating the pictures that would depict the textual portion of the multimedia presentation. For this to occur, the non-reader had to know the information that was to be presented and understand the power of the visual image and the connection between the two constructs. It was up to other students in the group to verbalize the content and to make sure each member of the group had a deep understanding of the issues involved.

Similarly, another research group included a student who was academically talented, but who was very quiet and reserved and would sit silently in the background until she was required to contribute. She was trying to work with a group of individuals who could not decide how to best approach their research question. The group recognized her academic talent, organizational skills and encouraged her to participate by working individually with each member of the research team to help edit and organize the information they had gathered. As a result of her success in this role she discovered that she possessed skills that she hadn't recognized.

Finally, each group synthesized the data gathered during their research, created a multimedia presentation of their findings and presented this information to other groups in the class, to other students in their grade level, and to a number of faculty members. The multimedia presentations were created with HyperStudio, an authoring tool that allowed students to incorporate text, video, audio, pictures, and internet links into a single presentation to showcase their knowledge acquisition in the subject area.

During this phase of the study, the teachers served as facilitators. They coached individual students and small groups as students made choices about research strategies. They provided resources and mediated discussions as students entered the editing process and helped students link new information to previously acquired knowledge and functioned as mentors and guides as they asked questions, demonstrated presentation techniques, or prompted students to build on each others' work. Additionally, the teachers helped problem solve technical difficulties with the technology.

MEASURES

Data were gathered in the classroom in the fall and spring semesters during the social studies instructional period. The classroom interactions that took place in large groups were videotaped and audiotaped by the research team. Prior to data collection, members of the research team visited the classroom and taped classroom student/teacher interactions before baseline observations took place in an effort to desensitize the participants to the presence of the observers and the video and audio equipment.

Observation System. Classroom interactions were recorded by members of the research staff not involved in teaching activities using an observation system designed for this project. The observation system was printed on data sheets and the observers simply tallied with pencil the type of each student/teacher interactions that occurred in large group instruction. The system consisted of categories of teacher interactions including: task/directions/management interactions; factual questions initiated by the teachers; interpretive questions initiated by the teachers, and teacher initiated lectures. Similarly, data were recorded regarding the number of student initiated questions and the percent of factual and interpretive questions asked.

Task/directions/management interactions were defined as those interactions where teachers provided directions about classroom activities or interacted with students to change their behavior in the classroom (e.g., “Clear your desk and prepare for a test” or “You need to stop talking and get on task!”).

Factual questions were defined as those that promoted the recall of information needed to formulate a response. These responses could then be evaluated as correct or incorrect (e.g., What musical instrument did Fania play?”). Research indicates that factual questions are frequently little more than knowledge restatements. In this form, factual questions represent the lowest level of knowledge construction (King, 1994).

In contrast, interpretive questions represented a higher level of interactions. These questions provided opportunities for students to engage in open ended dialogue with peers and teachers. Interpretive questions did not have a single correct answer but rather required students to move to a level of abstract thinking.

Teacher initiated lectures were identified as teacher dominated discussion in which the teacher delivered information to the students in a way that typified the transmission or lecture model of instruction.

Finally, the interactions that occurred during the intervention were analyzed to determine the percentage of interactions that occurred during each phase of the intervention. The intervention was divided into the following phases: 1) watching the anchor, 2) segmenting and retelling, 3) characterization, and 4) student research.

RELIABILITY

Observational Reliability. Three graduate student research assistants, who were not involved in instruction, were trained to analyze and record teacher and student interactions. Training took place several months prior to coding. First, the research team collaborated to develop a coding manual that defined the categories of behavior. Then the research assistants independently watched and coded practice tapes of classroom interactions based on the definitions that had been established. They then compared their results and made adaptations to the manual as needed. It was predetermined that this process would be repeated until all coders achieved a 90% interobserver reliability.

Following the training, the research assistants independently analyzed and recorded the interactions that took place as they observed tapes of the daily classroom instruction. Interobserver reliability was determined by a direct comparison of the coding sheets used to record daily interactions. Data were analyzed event by event. The interobserver reliability scores were stable at 89 percent. Interobserver reliability scores were obtained by dividing the total number of agreements by the total number of total number of agreements plus disagreements and multiplying by 100.

TEACHER INTERVIEWS

The two participating teachers were interviewed three times by project research assistants who had not interacted with the teachers and were not involved in the delivery of instruction over the course of the study. The interviews were conducted in the participating teachers’ classrooms and with the teachers’ permission. All of the interviews were AUDIOtaped. The first interview, which lasted approximately one hour, was conducted during the baseline phase of the study and focused primarily on exploring the teachers’ perceptions of their teaching and the instructional activities that occurred in the classroom. The second interview, which also lasted approximately one hour, was conducted after the completion of the anchored instructional activities involving To Kill a Mockingbird. The interview focused on the teachers’ thoughts and impressions about the instructional changes that took place as the multimedia anchored instruction intervention was implemented. They also were asked to comment on the

students' responses and outcomes that they noted during the intervention phase. The final interview, which lasted approximately two hours, was conducted after the completion of the anchored instructional activities involving Playing for Time. The interview focused on the teachers' perceptions of the instructional activities, the students' responses to the activities, and any changes the teachers planned to make in their approach to instruction as a result of participating in the study.

STUDENT INTERVIEWS

Participating students were interviewed three times by project research assistants. The interviews were conducted in the participating students' schools and with the students' permission; all of the interviews were audio taped. During the first interview students were asked to comment on the importance of school, the impact of graduating from high school on their ability to obtain a job, and whether they thought they would complete high school. The second interview was conducted after the students completed the To Kill a Mockingbird Instructional Unit. They were asked to describe their reactions to anchored instruction and particularly the use of multimedia as an instructional tool. They also were asked to describe their perception of the instructional content. The third interview was conducted after the completion of the anchored instructional activities involving Playing for Time. The content included repeating the questions posed during the first interview plus a series of questions asking for student satisfaction with a variety of instructional activities that had taken place.

RESULTS AND DISCUSSION

The results of the classroom observations, as described above, are summarized in Table 1. Table 1 includes the student/teacher interaction patterns in the classroom broken down across baseline conditions and the four phases used in the anchored instruction intervention: watching the anchor; retelling and segmenting the anchor; studying characterization, and student research.

BASELINE

During the baseline period an average 109.5 daily classroom student/teacher interactions were observed during each class period. 24.89% of these interactions focused on task/directions and management issues. During this time, the classroom teacher (project RAs) spent 3.65% of the class time engaged in lecture. 16.67% of the interactions between the students and the teacher were teacher initiated factual question (typically based on the lecture). An additional 10.96% of the interactions were spent asking students to respond to interpretive questions. Relatedly, students spent 26.71% of their time responding to questions posed by the teachers. Student initiated factual questions represented 12.56% of all student/teacher interactions while student interpretive questions represented 4.56% of the interactions. During baseline observations the majority of the instruction consisted of individual seat work. For the most part, students merely replicated the notes from the overhead projector on their own paper, transferred the information to worksheets and later restated the factual information on a test to indicate mastery of the material. Student questions focused primarily on clarifying tasks and directions. (e.g., "What do I do next?", "How do I find a word in the glossary?"). Student interactions were limited, and those that did occur were mainly social or behavioral.

PHASE 1-WATCHING THE ANCHOR

An average of 133.33 daily student/teacher interactions occurred during Phase 1. The number of task/directions and management issues decreased slightly during this phase with 18.13% of the interactions falling into this category. The teachers initiated lectures 3.0% of the time. Teacher initiated factual questions comprised 18.88% of the

interactions and teacher initiated interpretive questions increased to 17.13% compared to 10.96% during baseline. Students spent 37.86% of their time responding to teacher initiated questions. Students spent 4.38% of their time asking factual questions and .62% asking interpretive questions.

The pattern of interactions in this phase is not surprising when viewed in light of the goals for the "watching the anchor" phase in anchored instruction. Students and teachers watch the video-anchor together, with little or no comment and interpretation. The goal during this phase is to have the entire "community of learners"—students as well as teachers—experience the anchor together. Thus, it is expected that teacher directions and management would not differ substantially from baseline, because teachers are explaining the goals of this phase and ensuring that students are on-task and not disruptive during the viewing. At the end of each instructional period after viewing, the video anchor teachers and students would spontaneously ask why a given character did something, whether another action or choice could have been made, or ask "what if" something else occurred. The data reflects a substantial increase in the number of interpretive questions asked by the teachers and a sizable increase in the number of responses that students made to teacher questions. However, there was a decrease in the number of questions that students asked, which is not unreasonable, given the substantial increase in teacher questions and student responses, which reduced the opportunities for students to ask questions.

PHASE 2-RETELLING AND SEGMENTING

Compared to baseline, average daily interactions increased substantially from 109.5 to 287. Similarly, teacher interpretive questions increased from 10.96% to 23.46% of the interactions while teacher initiated factual questions decreased slightly from 16.67% to 15.45%. Teacher initiated lecture declined to 2.21% of the interactions, and the percent of teacher interactions related to management and task/direction issues declined to 10.99% from 24.89% of the interactions recorded during the instructional period. Students spent 45.41% of the instructional time engaged in answering teacher questions. Students initiated factual questions 4.25% of the time and interpretive questions 1.06% of the time.

The retelling and segmenting phase of anchored instruction is where interpretation and inferences are encouraged and valued. Indeed, McLarty et al. (1989) note that it is this step (which they also call "becoming expert in the anchor") that begins to reinforce the students' perception that they are important to the learning process. This step requires students to provide, through discussion and consensus, their own labels to segments of the anchor. These labels and segments are important in later teaching and learning, and students begin to realize their actions will influence the later learning of the entire group. The results are consistent with the focus ot this phase, as teachers' and students' factual questions decreased from baseline. The number of daily interactions and teachers' interpretive questions more than doubled from baseline levels demonstrating a positive change in classroom interactions. However, student based interpretive questions decreased during this time from 4.56% during baseline to 1.06% during this phase of the intervention.

PHASE 3-CHARACTERIZATION

A daily average of 195 interactions occurred during this phase, which is sizably more than the baseline average of 109.5. The percentage of task/directions and management issues were lower than those collected during baseline (17.44%) while teacher initiated lectures constituted 4.86 percent of the interactions—the highest level recorded during the study. Teacher initiated factual questions increased to 21.98% of the daily interactions. However, there was a slight increase in teacher initiated

interpretive questions from 10.96% (baseline) to 14.29%. Students spent 34.29% of their time responding to the teacher questions. Students spent 6.89% of their time asking factual questions and .29% asking interpretive questions during the large group activities.

During Phase 3 the anchor was used to teach characterization skills to the students. The characterization phase referred to segments from the anchor used to teach the difference between character "states" and character "traits," and to show how characterization was integral to the plot as played out in the anchor. The fact that the number of teacher management/direction issues continued to decrease while the number of daily interactions continued to increase indicates an increase in more positive student teacher interactions. Similarly, an increase in the percent of the time that students were responding to teacher questions (34.29%) also indicates that the students were more actively involved in their instruction as compared to baseline levels (26.71%). An increase in the teacher-initiated interpretive questions suggests that teachers were becoming more conscious of the need to increase such questions in their instruction. However, observers recorded fewer student initiated factual and interpretive questions during the large group instructional activities in this phase of the study.

PHASE 4-STUDENT RESEARCH

An average of 199.18 daily student/teacher interactions occurred during the student research phase of the intervention. This increase is substantial—almost twice the average number that were recorded during baseline (109.5%). The number of task/directions and management issues continued to decrease from a baseline level of 24.89% to 13.69% of the interactions while teacher initiated lectures increased slightly from 3.65% to 3.93%. Teacher-initiated factual questions accounted for 19.17% of the interactions while 18.07% of the interactions were teacher-initiated interpretive questions. Students spent 37.88% of their time responding to teacher initiated questions. They asked factual questions 6.30% of the time and interpretive questions .96% of the time. Although the data indicated that students were more actively involved in discussions and were actively responding to questions during this phase of the intervention, student-initiated questions declined in the observations made during the large group discussions.

The pattern of results in Phase 4 is consistent with the intent of student research as carried out in anchored instruction. Students are encouraged and expected to find information in the anchor and to work individually and in small groups to find evidence that is used in group projects and reports. Conversations take place between teachers and students during this phase of instruction and the conversations are guided by teacher questions as students endeavor to identify and use resource materials. Therefore, a decrease in the number of direction/management issues suggests that during this phase of the research, the class as a whole generally understood the directions and were sufficiently engaged in the task that few inappropriate behaviors were observed.

TEACHER INTERVIEW DATA

Initial interviews with classroom teachers indicated that they perceived themselves successful in providing an educational environment where all students could succeed. Their perceived success was based on their belief that the students enrolled in special education programs were able to participate in classroom activities in the same manner as their peers—copying notes from the overhead projector and with the supports needed to memorize factual material to correctly answer questions on alternative multiple choice social studies tests.

During the initial interview the classroom teachers stated that their current student population was "much lower functioning than other populations in the past," although they were unable to provide data to support this claim. During the final interview they reported that they were amazed by the enthusiasm, high level of task engagement and the remarkable amount of information the students learned while participating in multimedia anchored instruction. If fact, they were sufficiently impressed that they invited other teachers to visit their class to view student class participation, reports, and projects.

During the baseline period the teachers commented frequently on the lack of enthusiasm students showed while in the classroom. The teachers noted that their efforts to incorporate innovative classroom instruction resulted in severe behavior problems, therefore they relied on traditional instructional methods. They were pleasantly surprised by the students' enthusiastic response to anchored instruction. They reported that students enthusiastically participated in lessons and appeared to enjoy the instruction using multimedia-based instruction. The teachers suggested that the increase in task engagement was related to student interest in video activities.

Also, during the baseline condition, teachers reported that they noted that their "low functioning" students had extreme problems cooperating on any small group work or in any activity that required them to collaborate in any manner. Consequently, the teachers would not attempt any activities that required group interactions. However, after watching the frequent appropriate interactions among students during anchored instruction, they reassessed their positions. They were impressed by the sight of the students working cooperatively in groups to solve problems, compile research information, and prepare presentations. Teachers also reported that most students seemed to be successful and that the multimedia-based instruction enabled many students to overcome the barriers to successful performance. They reported that not only were students happier and more engaged in learning, but they actually attended class and school more often during the anchored instruction phase of the study.

STUDENT INTERVIEW DATA

Data from student interviews was particularly interesting in that students noted during the first interview that they found that the content that they covered during school hours had very little to do with their personal lives. They saw few connections among classroom subjects (i.e., reading and the ability to understand information from various content domains, spelling/writing skills and the ability to communicate ideas in classes other than language arts, etc.). Additionally, the students indicated that, for the most part, they simply went to classes and dealt with the content that was presented on an hourly basis. They did state that while they knew that it was important to have a high school degree or a college degree to get a job, they saw little connection between activities that occurred in middle school settings and opportunities available to them in the future. Consequently, few students placed a high priority on their involvement in classroom activities.

During subsequent interviews with the students, the researchers asked the students to comment on their increased levels of participation during classroom activities. With few exceptions, the students indicated that they believed that their involvement increased primarily as a result of the use of the video anchor as a tool to introduce concepts and information. They indicated that it was useful to be able to "see" the ideas presented in the video. One student with a reading disability stated that he was very adept at word calling when he was required to read a passage aloud during class. He noted that the classroom teachers heard the correct words being articulated but they were often unaware that he could not comprehend their meanings. He would sit

quietly during class discussions about the content of the text because he did not want his classmates to see his confusion. However, when the content was presented via the video anchor, he found he could participate fully. This new found ability to engage positively in classroom discussions effected the way he saw himself and the way he was perceived by his peers.

Students reported that they enjoyed the anchored instruction activities, including viewing the video, segmenting, and completing small group research projects. They indicated these activities were far preferable to entirely text-based activities. They particularly enjoyed developing and delivering their own presentations and, while they believed they worked harder, they also thought that they learned more when anchored instruction was used. Thinking activities were viewed as challenging and enjoyable. Overall, during the intervention they attended school more often and reportedly enjoyed school more while learning more.

CONCLUSION

Over the course of this preliminary study the number of daily interactions observed increased from an average of 109.5 during the baseline phase to an average of 203.63 per day during the four intervention phases of the study. Given the paucity of data available regarding the impact of anchored instruction on the number of classroom interactions, it was encouraging to see that the implementation of anchored instruction produced twice as many interactions per class period. Therefore, it successfully produced an instructional environment in which students were more active participants in learning. Not only were the students more actively involved in their learning, but interview data show that students were highly pleased with their increased participation and thought that they learned a substantial amount of information that they wouldn't have learned had they not be involved in the anchored instruction intervention.

In all intervention phases the number of daily interactions substantially exceeded the number recorded during baseline. This suggests that the intervention produced broad effects since, regardless of the specific anchored instructional activity, the overall effect was to increase opportunities for students to participate actively in instructional activities. In addition, the intervention also resulted in an increase in the quality of questions that were being asked by the classroom teachers during large group discussions. While we were initially concerned with the data which focused on the number of factual questions and interpretive questions that were initiated by students, our disappointment was tempered by interview data which suggested that these findings were misleading. Both student and teacher interview data suggest that although our data collection system was designed to monitor large group interactions, the majority of the higher level questions that students asked took place during small group interactions. We are currently in the process of evaluating interactions which took place within each of the small research groups to determine how conversations among these groups compared to those that occurred during large group discussions.

The highest percent of teacher initiated interpretive questions occurred during Phase 2 of the intervention, where the group was involved in retelling and segmenting activities. Numerous discussions ensued as students attempted to reach agreements about where to divide the anchor. This provided a fallow environment for teachers to act as coaches or facilitators to ask questions that required students to elaborate about or justify their rationale for dividing the video at a given point. This finding warrants additional studies to clarify and explore the relationship between specific instructional activities that might facilitate the increased use of higher order questions to help students construct higher order knowledge.

In contrast, as we began to implement our instruction, students began to interact in a very different manner within the classroom setting. Interviews with the regular

classroom teachers and the students indicated that students were much more involved in their learning. In all phases of the intervention, less time was spent on management issues and issues related to tasks and directions. These data suggest that, during the intervention, students were much more actively engaged in the instructional tasks and less likely to engage in off-task or in socially inappropriate behaviors.

As the students became expert with the anchor, they began to compare events depicted in the anchor to their own experiences. The resulting discussions became much more dynamic and complex. The students used the anchor as a point of departure to ask and answer questions and discuss complex issues. They made choices regarding what information they were looking for and how they should go about finding the answers. They began seeking knowledge, asking for more information, discussing their ideas, extending the ideas of others, and going beyond the text book. They became collaborators, and they became teachers. They did not wait for teachers to provide them with a list of facts or other related information. They made decisions on what issues they found the most compelling, and determined the best ways to use the available resources to find the answers to the questions they posed. Almost immediately, the students began to make links between some of the issues they identified during the fall semester to the curriculum presented during the spring semester. Interestingly, in several instances the students felt these links were important to their understanding of new information. For example, during one of the final student interviews, the interviewer asked a student if she noticed any changes in her Social Studies class over the course of the year. She responded:

STUDENT: Yeah, we went from studying the continents to learning about the Depression and from the Depression learned about the Holocaust. But, the Depression and the Holocaust, kinda in a way, went together. In a way.

INTERVIEWER: How?

STUDENT: Cause like when you all came the first semester we learned about the Great Depression, and part of the Holocaust was because of the Great Depression. And if you had just started off teaching us about the Holocaust, there would still have been this little bitty piece that we wouldn't of understood about it. Because of the Holocaust, one of the main reasons we got started on this was because of a Depression and if we wouldn't have learned about the Great Depression at first, we wouldn't have fully known about the Holocaust.

Additionally, during the intervention, the content that the students were exploring held both implicit and explicit messages about what it means to be a contributing member of society. Many of the classroom discussions on the events during the 1930s and the events that took place during the Holocaust focused on the need for all individuals in a society to have a voice and be able to be heard. Interestingly, a majority of the students stated that there was a connection between Nazi attitudes and actions, and those of street gangs. Several students noted that in both situations, people were dehumanized in order to create an atmosphere that encouraged hate or violence. The students clearly stated their beliefs that it is important to question attitudes and actions that we do not agree with and that we must work together to find solutions to difficult questions that plague society.

However, these skills, like all others, must be learned and practiced. In this modified classroom environment, learning became the task of recognizing, evaluating, and using a variety of resources to effectively answer a question that the learner thinks is important to gaining a better understanding of a problem or question they have posed. By allowing students to have a voice in the classrooms and by providing them with opportunities to work together to solve difficult problems, we are preparing them for life. Simply put, that is the true role of a teacher—and this is true for all students at all ability levels.

One limitation to the study was a result of the data collection procedures. The audio and video taping procedures worked well during large group interactions but were limited in their ability to capture small group interactions due to the level and types of activities that students were involved in. However, several of the intervention phases incorporated extensive small group activities, thus skewing our ability to analyze student conversations during all aspects of the study. However, as baseline data did not include small group interactions (this procedure was not a part of the teachers' normal routine) the baseline and instructional data are comparable. In the future, data should be collected from both large and small group interactions.

We also note that this was a preliminary and descriptive study and so definitive conclusions should not be drawn. However, the results are sufficiently promising to warrant systematic research examining and analyzing the impact of multimedia anchored instruction on student interactions and to analyze the impact of different components of anchored instruction on the type and quality of student interactions and questions.

ADDED MATERIAL

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TABLE 1 Teacher and Student Interactions by Research Phase

Study Phase	Avg. # Daily Interact	% -Task Dircts/ Mange	% -T's Ask-Fact Quest	% -T's Ask-Intrpt Quest	% -T's Lect	% -S's Resp to T-Quest	% S's Ask Fact. Q	% S's Ask Intprt Q
Bsln	109.50	24.89	16.67	10.96	3.65	26.71	12.56	4.56
Phase 1	133.33	18.13	18.88	17.13	3.00	37.86	4.38	0.62
Phase 2	287.00	10.99	15.45	23.46	2.21	45.41	4.25	1.06
Phase 3	195.00	17.44	21.98	14.29	4.86	34.29	6.89	0.29
Phase 4	199.18	13.69	19.17	18.07	3.93	37.88	6.30	0.96

Bsln = Baseline
Phase 1 = Intervention - Watching the Anchor
Phase 2 = Intervention - Retelling and Segmenting
Phase 3 = Intervention - Characterization
Phase 4 = Intervention - Research

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